

WHAT IS CLAIMED IS:

1       1. A suturable adhesion-preventing membrane for guided  
2       tissue regeneration comprising at least one non-woven fabric  
3       layer made of collagen fibers, or having at least one non-  
4       woven fabric layer made of collagen fibers and at least one  
5       sponge layer made of collagen, characterized in that a  
6       surface of the membrane is provided with a coating layer of  
7       gelatin or hyaluronic acid.

1       2. A suturable adhesion-preventing membrane for guided  
2       tissue regeneration according to claim 1, wherein the coating  
3       layer containing gelatin or hyaluronic acid is a sponge or  
4       film.

1       3. A suturable adhesion-preventing membrane for guided  
2       tissue regeneration according to claim 1, wherein the coating  
3       layer containing gelatin or hyaluronic acid comprises cross-  
4       linked gelatin or hyaluronic acid.

1       4. A suturable adhesion-preventing membrane for guided  
2       tissue regeneration according to claim 1, wherein the coating  
3       layer containing gelatin or hyaluronic acid is formed by  
4       lyophilization.

1           5. A suturable adhesion-preventing membrane for guided  
2           tissue regeneration according to claim 1, wherein the coating  
3           layer containing gelatin or hyaluronic acid is a compressed  
4           sponge layer.

1           6. A suturable adhesion-preventing membrane for guided  
2           tissue regeneration according to claim 1, wherein the coating  
3           layer containing gelatin or hyaluronic acid has a thickness  
4           of 0.05 mm to 20 mm.

1           7. A suturable adhesion-preventing membrane for guided  
2           tissue regeneration according to claim 1, wherein the  
3           collagen of the collagen fibers and the collagen of the at  
4           least one sponge layer are independently selected from  
5           enzyme-solubilized collagen, acid-solubilized collagen,  
6           alkali-solubilized collagen or neutral solubilized collagen.

1           8. A suturable adhesion-preventing membrane for guided  
2           tissue regeneration according to claim 1, wherein a part or  
3           all of the collagen in the non-woven fabric layer made of  
4           collagen fibers comprises a cross-linked collagen.

1           9. A suturable adhesion-preventing membrane for guided  
2           tissue regeneration according to claim 1, wherein the non-

3 woven fabric layer made of collagen fibers is obtained by  
4 coagulating collagen fibers which are extruded and crossed  
5 over in multiple folds, or extruded and wound on a plate in  
6 a certain direction to have paralleled lines of fibers, and  
7 compressing the coagulated fibers.

1 10. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 1, wherein the non-  
3 woven fabric layer made of collagen fibers is a layer in  
4 which the fibers are joined together using a binder comprised  
5 of solubilized collagen solution.

1 11. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 1, wherein the non-  
3 woven fabric layer made of collagen fibers has a thickness of  
4 0.05 mm to 100 mm and the coating layer made of gelatin or  
5 hyaluronic acid has a thickness of 0.050 mm to 20 mm.

1 12. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 1, wherein the  
3 membrane is composed of a laminated membranous substance  
4 having one to six layers of the non-woven fabric layer made  
5 of collagen fibers.

1           13. A suturable adhesion-preventing membrane for guided  
2           tissue regeneration according to claim 1, wherein the  
3           collagen non-woven fabric layer has fibers having a fiber  
4           diameter of 5  $\mu\text{m}$  to 1.0 mm, and a bulk density (fiber  
5           density) of  $5 \times 10^{-4}$  to 5  $\text{g}/\text{cm}^3$ .

1           14. A suturable adhesion-preventing membrane for guided  
2           tissue regeneration according to claim 1, wherein the overall  
3           thickness of the membrane is 0.1 mm to 50 mm.

1           15. A suturable adhesion-preventing membrane for guided  
2           tissue regeneration comprising: a compressed non-woven fabric  
3           layer composed of cross-linked collagen fibers wherein the  
4           layer has fibers having a fiber diameter of 20 to 100  $\mu\text{m}$ , a  
5           bulk density of  $1.0 \times 10^{-3}$  to  $5.0 \times 10^{-2} \text{ g}/\text{cm}^3$  and a thickness  
6           of 0.2 mm to 1.0 mm; and a coating layer containing gelatin  
7           or hyaluronic acid covering each surface of the compressed  
8           collagen non-woven fabric layer; and wherein the membrane has  
9           a thickness of 0.5 mm to 2.0 mm.

1           16. A suturable adhesion-preventing membrane for guided  
2           tissue regeneration comprising: a laminate of two or three  
3           compressed non-woven fabric layers each composed of cross-  
4           linked collagen fibers wherein each layer has fibers having

5 a fiber diameter of 150 to 250  $\mu\text{m}$ , a bulk density of 0.05 to  
6 2.0  $\text{g}/\text{cm}^3$  and a thickness of 0.5 mm to 2.0 mm; and a coating  
7 sponge layer containing gelatin or hyaluronic acid covering  
8 each surface of the laminate of non-woven fabric layers; and  
9 wherein the membrane has a thickness of 1.0 mm to 4.0 mm and  
10 is heat cross-linked.

1 17. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration comprising a laminated membranous  
3 substance having at least one non-woven fabric layer made of  
4 collagen fibers and at least one sponge layer made of  
5 collagen, characterized in that a surface of the laminated  
6 membranous substance is provided with at least one layer  
7 containing gelatin or hyaluronic acid.

1 18. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein the coating layer containing gelatin or  
3 hyaluronic acid is a sponge or film.

1 19. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein the coating layer containing gelatin or  
3 hyaluronic acid comprises cross-linked gelatin or hyaluronic  
4 acid.

1                   20. A suturable adhesion-preventing membrane according  
2                   to claim 17, wherein the layer containing gelatin or  
3                   hyaluronic acid is formed by lyophilization.

1                   21. A suturable adhesion-preventing membrane according  
2                   to claim 17, wherein either the at least one non-woven fabric  
3                   layer or at least one sponge layer in the laminated  
4                   membranous substance is compressed, or the membranous  
5                   substance is compressed.

1                   22. A suturable adhesion-preventing membrane for guided  
2                   tissue regeneration according to claim 17, wherein the  
3                   coating layer containing gelatin or hyaluronic acid has a  
4                   thickness of 0.05 mm to 20 mm.

1                   23. A suturable adhesion-preventing membrane according  
2                   to claim 17, wherein the collagen of the collagen fibers and  
3                   the collagen of the at least one sponge layer are  
4                   independently selected from enzyme-solubilized collagen,  
5                   acid-solubilized collagen, alkali-solubilized collagen or  
6                   neutral solubilized collagen.

1                   24. A suturable adhesion-preventing membrane according  
2                   to claim 17, wherein a part or all of the laminated

3 membranous substance comprising at least one non-woven fabric  
4 layer made of collagen fibers and at least one sponge layer  
5 made of collagen comprises a cross-linked collagen.

1 25. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein the at least one non-woven fabric layer  
3 made of collagen fibers is a layer obtained by coagulating  
4 collagen fibers which are extruded and crossed over in  
5 multiple folds, or extruded and wound on a plate in a certain  
6 direction to have parallel lines of fibers, and compressing  
7 the coagulated fibers.

1 26. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein the at least one non-woven fabric layer  
3 made of collagen fibers is a layer in which the fibers are  
4 joined together using a binder comprised of solubilized  
5 collagen solution.

1 27. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein the at least one non-woven fabric layer  
3 made of collagen fibers has a thickness of 0.05 mm to 10 mm,  
4 the at least one sponge layer made of collagen has a  
5 thickness of 0.05 mm to 20 mm and the coating layer  
6 containing gelatin or hyaluronic acid has a thickness of 0.05

7 mm to 20 mm.

1 28. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein one to six layers of the at least one  
3 non-woven fabric layer made of collagen fibers are laminated  
4 with one to four layers of the at least one sponge layer made  
5 of collagen, and further, one to four layers of gelatin or  
6 hyaluronic acid layer are laminated thereon, and as a whole,  
7 three to fourteen layers are contained.

1 29. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein the at least one non-woven fabric layer  
3 made of collagen fibers has fibers having a fiber diameter of  
4 5  $\mu$ m to 1 mm and a bulk density (fiber density) of  $5 \times 10^{-4}$  to  
5 5 g/cm<sup>3</sup>.

1 30. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 17, wherein the  
3 overall thickness of the membrane is 0.1 mm to 50 mm.

1 31. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein the at least one sponge layer made of  
3 has a porosity area of 10 to 90 %.

1                   32. A suturable adhesion-preventing membrane for guided  
2                   tissue regeneration, comprising: a laminated membranous  
3                   substance that has a first layer of a compressed collagen  
4                   sponge layer, a second layer of a chemically cross-linked and  
5                   compressed collagen non-woven fabric layer, and a third layer  
6                   of a compressed collagen sponge layer; and a coating layer  
7                   containing gelatin or hyaluronic acid, covering each surface  
8                   of the laminated membranous substance.

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8                   33. A suturable adhesion-preventing membrane for guided  
                 tissue regeneration comprising: a laminated membranous  
                 substance that has a first layer and a second layer of a  
                 chemically cross-linked and compressed collagen non-woven  
                 fabric; compressed collagen sponge layers provided on both  
                 sides of the laminated membranous substance; and a coating  
                 layer containing gelatin or hyaluronic acid, covering each  
                 sponge layer.